CHAPTER 7

New Ways to Throw New Bombs – Grenade Launchers 1916–18

The first grenade that could double as a hand grenade and a rifle grenade was the Mills. It was also the first time-fused rifle grenade. This fact, combined with its lever mechanism, presented a number of problems that had to be resolved before the Mills rifle grenade could become a viable proposition. The solutions eventually led to a method of launching rifle grenades without recourse to rods, although the first Mills rifle grenades were fitted with short ones. However, these were eliminated with the cup discharger. This device might not have been developed without the Mills and its lever although it came to be used with grenades that had no lever.

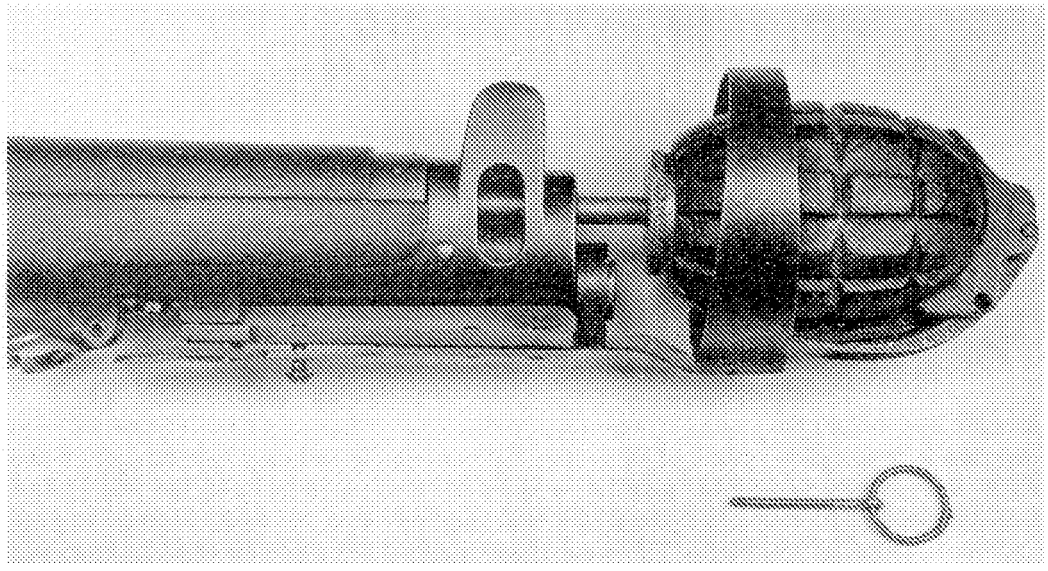
The desire to do away with the rods was shared by the rifle grenadiers who had to lug them about and the research departments in the UK. Steel was a precious commodity and rifle grenade rods used a lot of it. In 1917 it was calculated that 50,000 15 in rods required 7 tons of steel. Considering that this was the approximate consumption per week, this amounted to some 364 tons of steel a year. As far as transporting the rods was concerned, the grenadier had his work cut out. It was an unenviable job to have to carry up to sixteen rodded grenades at a time; although not in battle, only as a workhorse. Sixteen weighed in the region of 20 lb. Furthermore, the rods had to be protected against accidental damage as well as mud which could render them unusable. Eight or sixteen rifle grenades made for an awkward and unwieldy load that was not easy to carry down trenches with all their bays and traverses and tight corners.

Various carriers were tried. In the spring of 1917, trials were conducted with an experimental pattern of carrier designed at one of the workshops. It consisted of a tin cylinder with a lid at each end to hold eight rodded grenades, four at each end, the rods passing through holes in a central wooden partition. As it was not contemplated that the grenades would normally form part of the permanent equipment of the rifle grenadier in battle, it was primarily a means of carrying them forward quickly when required. It was envisaged that it could be carried by a rifle grenadier with relative ease (it had a sling), without interfering with his use of the rifle and bayonet, although it is hard to see how anyone could bring his rifle to bear if he was lugging rifle grenades about. Basketwork containers, lined with waterproof material, were also tried. The trial showed that it was difficult to remove and replace the lid of the tin version and that the carrier was too heavy, difficult to carry down trenches and very noticeable in the open. The basketwork version and an ordinary haversack with a board fixed in the bottom, perforated with six holes for the rods with an extension to protect them, were both thought to be better alternatives. In the end, however, none were judged to be superior to the old style bucket pattern and it had all been a bit of a waste of time.

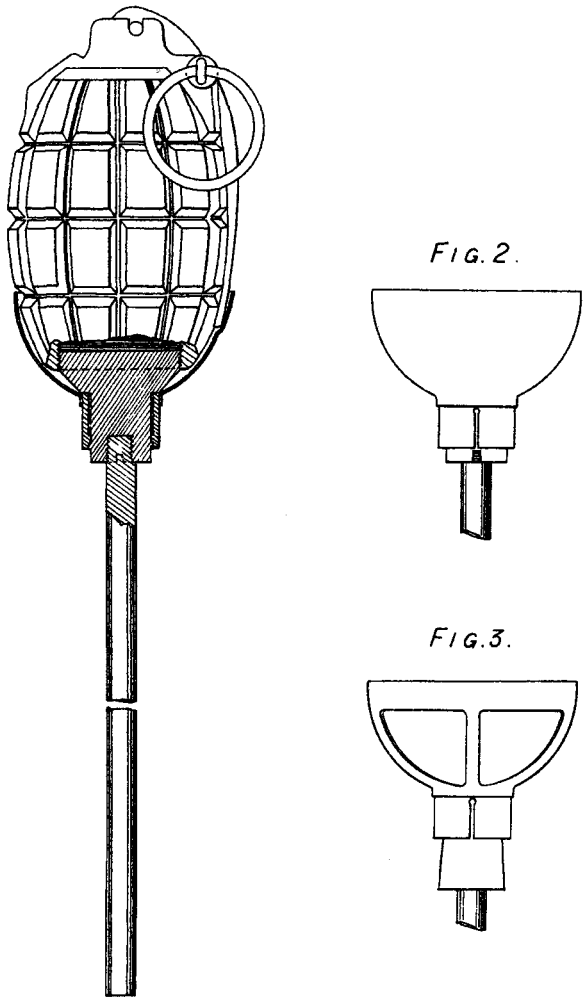
That sort of conclusion was not uncommon. At about the same time that the rodded grenade carriers were being trialled, a bandoleer with spring hooks to carry sixteen hand grenades was tried out. It was worn over the left shoulder and under the right arm, with the hooks opening in front and facing downwards; as the grenades were taken out and used, the belt was merely slipped round. It seemed like a good idea but it did not work in practice. The hooks were too weak to hold the grenades during rapid movements. Had the hooks been stronger, however, it would have been difficult to insert and withdraw the grenades. Moreover, the bandoleer got in the way of the box respirator which had become the standard issue gas mask by then. In any case, sixteen grenades were simply too many to carry. The bandoleer was dropped.

That the Mills – for which the bandoleer grenade dispenser had been designed – could be adapted to become a rifle grenade was an inbuilt feature of the grenade, albeit unintentional. The requirement of all rifle grenades at that time was the ability of the body to take a rod. No other design of hand grenade had the potential to house a rod. The Mills could do it because it had a base plug (closing the hole into which the centre-piece was inserted), originally made of aluminium, a soft alloy or brass. None of these materials was strong enough to withstand the stresses of launching a grenade: the steel rod was pushed through the base plug. However, it was but a simple matter to replace the plug with one made of a something stronger. Steel was used first but this was later replaced with one of cast iron in the interests of economy. This had a 0.25 in diameter screw-threaded hole bored in it to take a 5.5 in long rod. It was launched by a 35-grain cordite blank but this was later replaced by a standard 43-grain cartridge used for launching all rodded grenades.

The problem with the Mills was not so much the provision of a rod but how to keep the lever in place once the pin had been removed prior to firing from the rifle. If the lever could not be retained, the striker would hit the cap and ignite the fuse; the grenade would

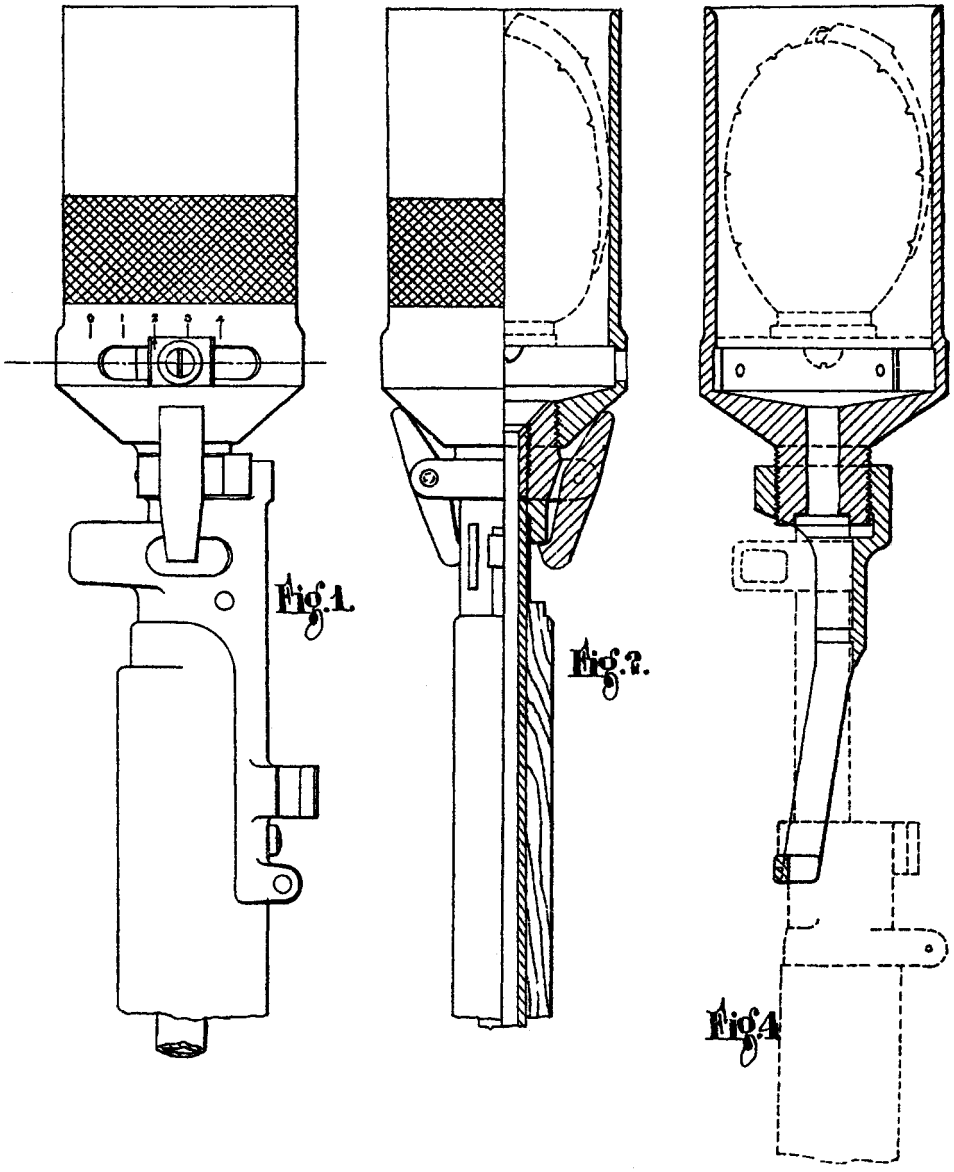


No. 4 Mk I grenade cup made in three parts and fitted to the rifle's bayonet attachment points. This had the advantage of doing away with the necessity of fitting the bayonet to fire rifle grenades. The rod has not been fully inserted in the barrel. (IWM)



Hale's invention (UK patent 109,273) for firing a Mills rifle grenade using a form of cup to retain the lever, only this one is attached to the rod assembly rather than to the rifle. The cup is held in place by an annular clip that sets back on discharge, allowing the cup to fall back and release the lever. In a simpler version, the lever is retained by a metal strip attached to the clip. The grenade needed a specially machined base plug for the clip in both cases.

detonate long before the grenadier was ready to discharge it from the rifle. The answer was the grenade cup, a clever piece of designing that was simple and easy to manufacture and which was secured to the rifle with the bayonet. Made from sheet steel, the No. 1 Mk I grenade cup, consisted of a one-piece stem and ring, the latter having a diameter slightly greater than that of the Mills. The stem fitted under the muzzle so that the ring was positioned about 2.75 inches in front and concentrically with the barrel. The sides of the stem curved up round the nose cap of the rifle, the bottom of the curved part having a slot cut in it to allow the bayonet ring to engage the lug on the nose cap. The end of the stem



Robert Burn's cup discharger (UK patent 126,692). The rifle on the right is a P14 and the discharger required a different form of adapter for it to be fitted to the muzzle.

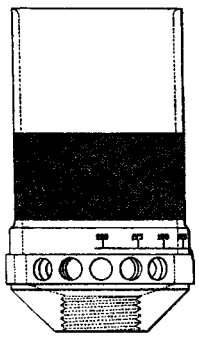
was forked so that it went round the bar that engaged the slot in the pommel of the bayonet. When the bayonet was fitted, the grenade cup was firmly fixed in place. With the grenade loaded in the rifle, the ring prevented the lever from releasing until the grenade was fired. A later variation was the No. 4 Mk I cup which was made in three pieces and could be fitted to the rifle without the bayonet as it was fixed to the rifle via the bayonet attachment points.

The Mills in its rodded form was designated the No. 23 Mk I. Brothers thought that this was the 'most useful development of the grenade' which was introduced with the cup in 1916. By the middle of following year, the Mills had been redesigned and reintroduced as the No. 23 Mk III which was essentially the same as the No. 36 Mk I. This, instead of being adapted to take a rod, was intended to be fired from an entirely new device which did away with the rod. The cup discharger not only made the rod redundant but increased the range by as much as two and half times that of the rodded grenade and provided the grenadier with a much easier method of varying the range. Moreover, the discharger allowed grenades to be thrown more accurately than rodded grenades.

Trials with the cup discharger were carried out in France during the spring of 1917 and were so successful that GHQ immediately requested a supply of ninety-six per battalion and 'a reserve of 10% on the Lines of Communication'. By October the dischargers were being delivered but the discharger only entered widespread use in the last few months of the war. The cup discharger was known by several names, mostly derived from its inventor, Robert Burn, a New Zealander who owned an engineering business in Petone and in 1917 was a lieutenant in the New Zealand Mechanical Transport section. He filed a patent application in February and another in August and these were combined in UK patent 126,692 granted to him in May 1919.

The discharger consisted of a 2.5 in steel cylinder about 4 in long with a solid, truncated cone at its base which could be screwed on to an adapter block, pierced by a hole the size of the rifle bore, and shaped to fit flush with the muzzle and engage the bayonet lug. The whole assembly was secured firmly in place by two pawls, the hooked ends of which engaged the oval holes in the muzzle cap while the opposite ends bore against the cone of the discharger. The Mills was furnished with a gas check disc which fitted the bore of the discharger so that the propelling gases were sealed behind the grenade and acted over the whole of the area of the disc until the grenade left the cup. The grenade was fitted with a 7-second fuse when fired from the Burn discharger.

The range of the discharger could be altered with an adjustable gas port in the base of the cylindrical part of the device that allowed propellant gases to escape below the grenade gas check. Following the trials, a mechanical defect was found in the design of the gas port, necessitating modifications. The gas port was opened or closed by a sliding shutter and was graduated according to range. With the rifle held at 45° and the port fully open, the grenade reached 80 yd; with it fully closed the range was 200 yd. In December 1917 G.R. Thatcher filed a patent application for an improved gas port system in which a sliding ring with a series of holes in it could be rotated about the base of the cylinder which also had a series of holes. This became UK patent 129,740 and appears to have been used on later versions of the discharger.



Thatcher's adaptation of Burn's discharger (UK patent 129,740).

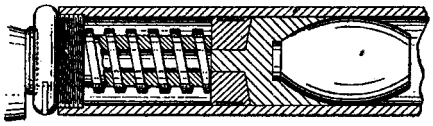
Experiments were subsequently conducted with the No. 34 Egg grenade although this required a narrower-bore discharger which the Army Council was not keen to sanction, arguing that it would require too much steel and the rifle grenadier did not want to have to carry two dischargers. As far as the consumption of

How to launch a grenade from the Burn discharger. This Royal Engineer is wearing a box respirator. (IWM)

materials was concerned, the Army Council was mistaken, as a second discharger would actually reduce the amount of steel used for rifle grenades. The egg grenade could be fired to an even greater distance than the Mills, up to about 500 yd.

Although the Burn discharger, irrespective of which grenades were fired from it, had considerable advantages over the rodded grenade it was not perfect. There were problems with the propelling cartridge which caused a bright flash when the gas port was open. The recoil was heavy but if the power of the cartridge was reduced to make it more comfortable, the maximum range would be reduced to a mere 150 yd. The Mills was heavy and made heavier by the necessity of gas check discs. And the procedure for fastening the cup to the rifle, involving screwing the cup part to the block with the pawls, which had to be engaged to fix it firmly to the rifle, was not ideal; 'a feature which will in future designs be eliminated', hoped Brothers in 1919.

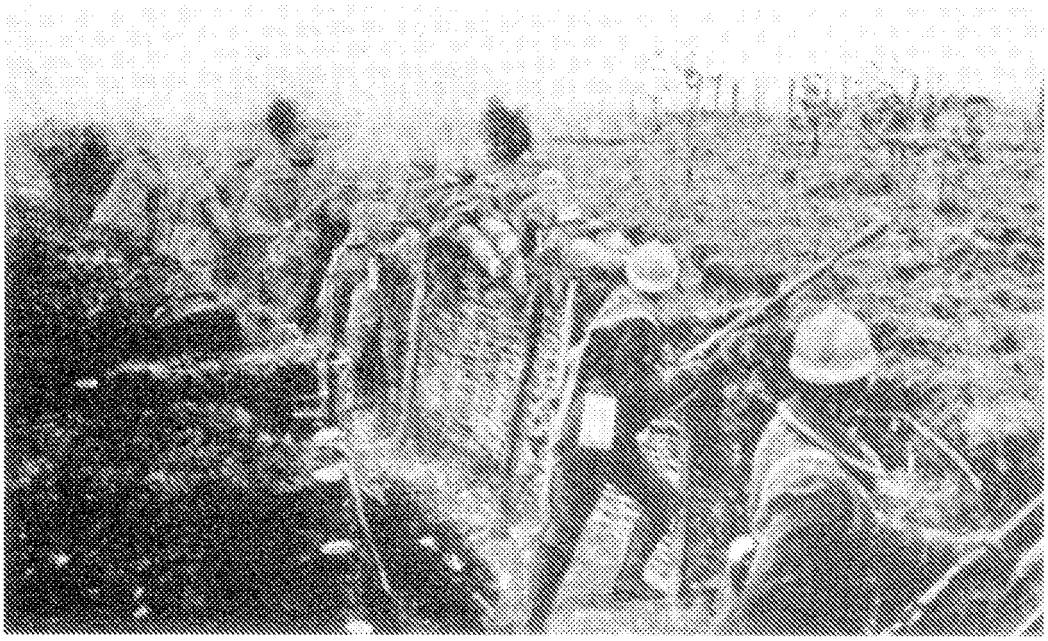
The idea was not a bad one, just its embodiment, since precision was once again necessary in the manufacture of the various components of the discharger if they were to fit together correctly. The fact that the pawls had to press against the cone of the discharger meant that the cone had to be made very precisely otherwise unequal pressure was exerted on them, preventing a firm grip of the rifle. Vibration from a series of discharges caused the cup to tilt if the pawls were not equalized so that the seal between the discharger and the muzzle was lost. The propellant gases were very hot and travelled at high velocity so that they very quickly eroded any gap to a much bigger one and damaged the screw thread of the adapter block so that the join between the block and cylinder seized up.



A form of cup discharger invented by A.L. Chevallier and H.J. Blanch (UK patent 101,108) in early 1916. The cup is a slidable sleeve that fits over the barrel. A wooden sabot centres the grenade. On firing, the sleeve moves forward against a spring which absorbs some of the recoil.

The propellant gases also tended to erode the holes in the gas port, reducing the range that was supposed to be obtained for a particular setting. Doubt was cast on the value of altering range with such a system in any case, because of the effects of wind, air temperature and rain. Wind, in particular, had a considerable effect especially if the grenade was fired into it. Moreover, doubt was expressed after the war whether 'the average man in the excitement of action would trouble to adjust a mechanical device of this nature'. There may have been some truth in this concern but if men could be trained to use the Mills as a hand grenade correctly, so that the number of accidents was significantly reduced, then they could also be trained to use the discharger correctly.

Range was intertwined with the size of the grenade and the maximum recoil the rifle could withstand. Experiments showed that the maximum velocity at which a No. 23 Mills, which weighed 27.5 oz with the gas check, could be safely fired was 140 ft per second which threw it out to approximately 150 yd. On the other hand, a 17.5 oz grenade could be fired at 220 ft per second to more than 300 yd. Range was also affected by the length of the cup; the longer it was, the greater the time spent by the gases in propelling the grenade, so it travelled further as a result. However, a longer cup made for greater recoil.

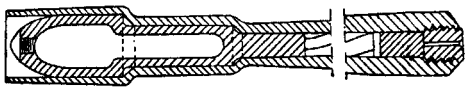


French troops armed with Viven-Bessière grenade dischargers. Note that the two soldiers in the foreground are resting the butts of their rifles against their hips rather than on the ground. This is not a posed shot. (The Times History of the War)

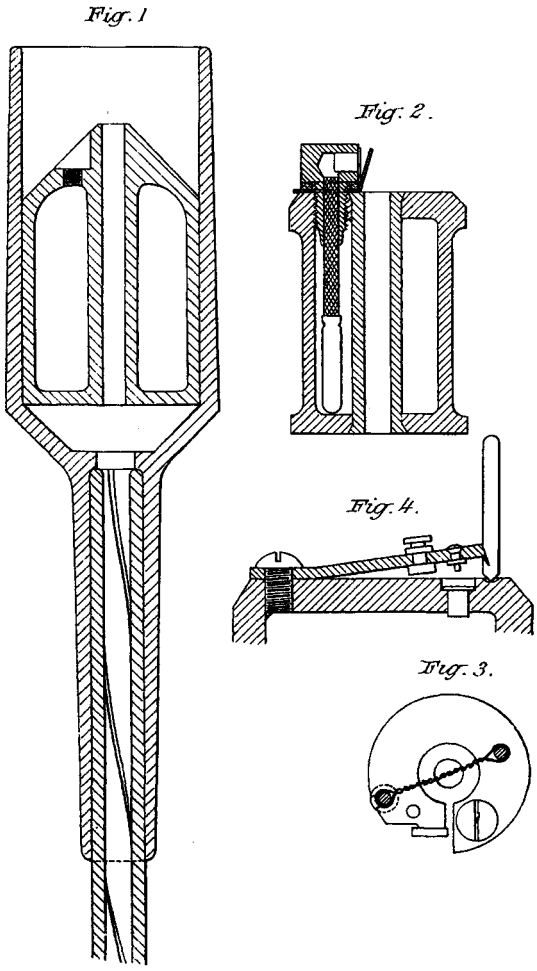
The cup discharger was a variation of a French device invented by engineers Jean Viven and Gustave Bessière in 1916 which saw widespread use in the French Army and was later adopted by the Americans when they entered the war. It was also used by the British from 1917. The inventors were granted two UK patents for the device and its ammunition, 100,700 and 104,836, and a third, 109,498, for a branched double-tube device. Their launcher was simply a large-bore muzzle attachment that fired a special grenade designed for it but whereas the Burn discharger used blank cartridges, the Viven-Bessière used the normal ball ammunition.

The grenade had an axial bore through which the bullet travelled and the expanding gases following it propelled the grenade out of the discharger. The bullet also acted as an obturator to seal the gases during its passage through the grenade and imparted rotation to it. A fuse-triggering device on the top of the grenade was activated by the bullet deflecting a lever. Either time-fused or percussion-fused grenades could be fired from it. Like the Burn device, the Viven-Bessière suffered from being a piece of precision engineering. If the grenade did not sit squarely in the tube which depended on the precision of the bore, and if tube was not squarely attached to the muzzle, the bullet would strike the side of the bore.

From the earliest days of the rifle grenade, the butt of the rifle had to be held firmly against the ground to fire it because the recoil was too severe to fire it from the



Viven and Bessière's first UK patent application, dating from 1915 (granted as 102,371). The drawing shows a barrel extension with 'two . . . gradually increasing diameters'.

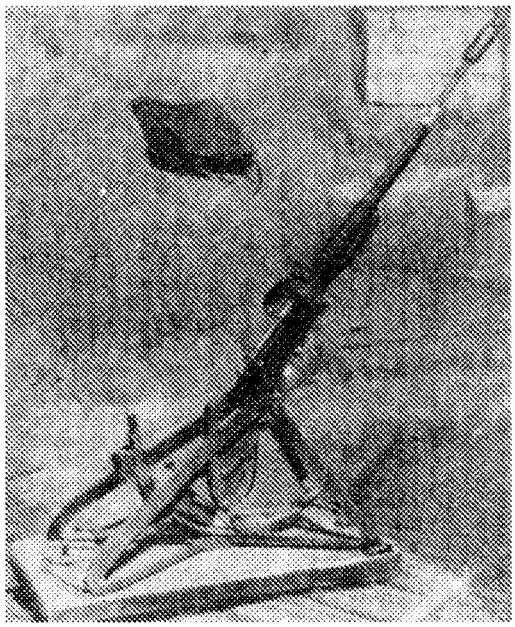


Viven and Bessière's second UK patent, 100,700. The reason it has a lower number than the earlier application is because the second one was granted first. Details of the grenade arming system are illustrated in the right-hand figures. Top: *time-fused version of the grenade.* Middle: *percussion-fused version.* Bottom: *detail of percussion fuse, the large disc in fig. 3 extending diagonally from the screw in fig. 4.*

shoulder. As a consequence of this, wooden stands or cradles were devised to support the rifle. The first ones were no more than improvisations from suitable lengths of timber. In February 1915 the 1st Cameronians used an double A-frame arranged on its side and provided it with a seat for the grenadier. However, being so close to the rifle grenade when it was fired was not encouraged in case of a premature at the muzzle, although similar devices seem to have been common for a while at least.

By mid-1915, the Second Army Workshops were making devices for firing rifle grenades. The device was quite sophisticated, allowing elevation and direction adjustments and may have been a simplified copy of a German apparatus for holding a rifle which incorporated a recoil-absorbing spring. According to Todhunter's description and sketch, it consisted of a platform with a turntable on which was a holder that could be pivoted in the vertical plane, all of which was cast in brass using old cartridge cases. The turntable and the holder were graduated to improve accuracy. The barrel from a long rifle (from a Lee Metford, for example) was cut to the length of the barrel in the SMLE service rifle and secured in the holder. Todhunter's report in June 1915 implied that the only limiting factor in the provision of this apparatus was the supply of brass which was also being used to make trench mortars. There is nothing to suggest

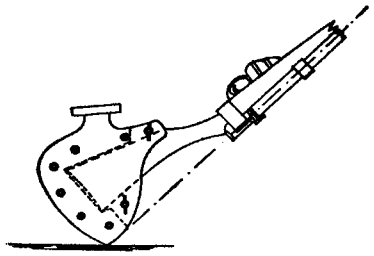
February 1915 and a 1st Cameronian prepares to fire a No. 3 rifle grenade. The rifle is fixed in an improvised timber stand. This is yet another posed shot. In reality, the rifle grenadier would fire the rifle by a lanyard while he was well out of harm's way. (IWM)



A German rifle grenade stand, 1915. Although heavily retouched, this photograph, from The Times History of the War, *shows the stand quite well. Unlike the crude wooden device used by the 1st Cameronians, it is made of metal and is adjustable for elevation. The rifle is clamped into a cradle with the butt clamped to a curved metal track, the latter's position on which could be altered. It may have been this device that inspired Kneeshaw. The grenade appears to be the 1914 Rifle Grenade without its bowled tin disk.*

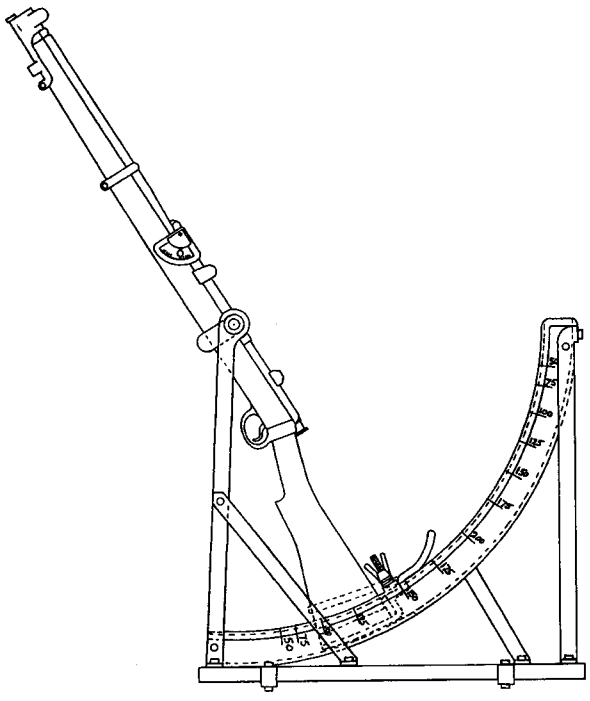
how many were being made or how effective it was, but judging from the other devices designed and made at the workshop it was probably a useful addition to the armoury.

A few inventors tried their hands at devising suitable stands, among them K. and W. Gauldie who came up with what must have been one of the most unusable, not to say unsafe, gadgets imaginable. It was an approximately triangular plate with curved sides that was supposed to be bolted to the butt. Two of the curved sides met at a sharp apex and this was supposed to be the sole point of contact with the ground. To make matters more difficult the apex was to be aligned with the axis of the barrel. The idea was that this would prevent rotational displacement when the grenade was fired. The plate was even provided with a seat for the poor grenadier. It is not hard to imagine what would have happened had anyone been foolish enough to try this device, which became UK patent 102,755.

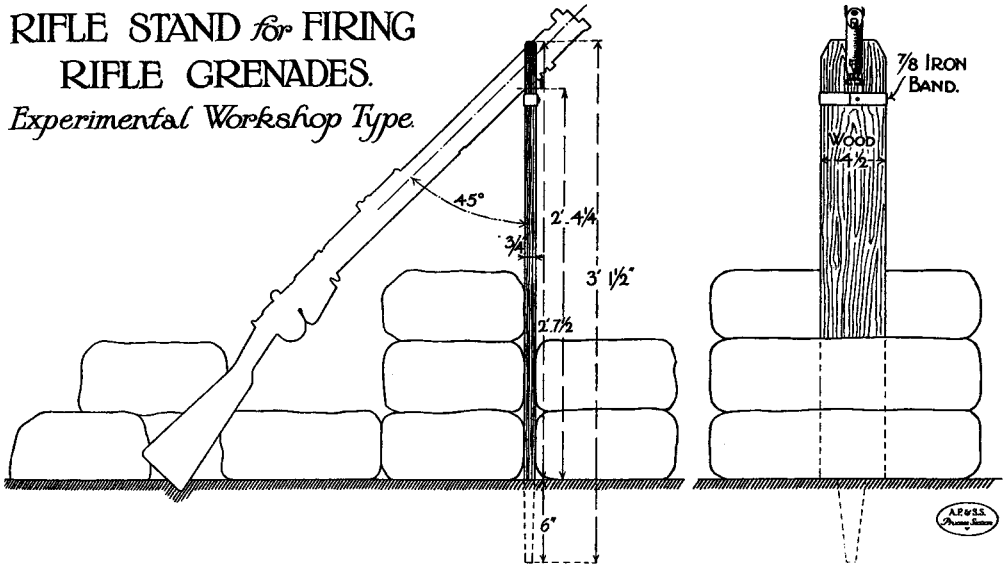


The Gauldies' device for firing rifle grenades (UK patent 102,755).

A couple of months after the Gauldies filed their application in January 1916, Wilfred Kneeshaw, a second lieutenant in the 4th Battalion, Royal Welch Fusiliers, filed an application for a more realistic stand (UK patent 101,441). It consisted of a rectangular base with four stabilizing arms which could be weighed down with sandbags to absorb the recoil. A pair of braced uprights at the front end of the base had a pivotable cradle to support the fore-end of the rifle just in front of the magazine. In fact, the fore-end was fastened to it otherwise the recoil would make the rifle jump out as soon as the grenade was fired. The butt was supported in a padded shoe that could be securely bolted to a curved trough. By pivoting the rifle in the cradle, the butt could be moved to a different position in the trough so that the rifle pointed at a different angle to allow grenades to be fired to different distances as required. This stand must have been used by Kneeshaw in France before he brought the idea to England to have it patented, so it is not unreasonable to assume that this was a workable device. However, there appears to be no documentary evidence to show that it was used.



Kneeshaw's stand for firing rifle grenades (UK patent 101,441).



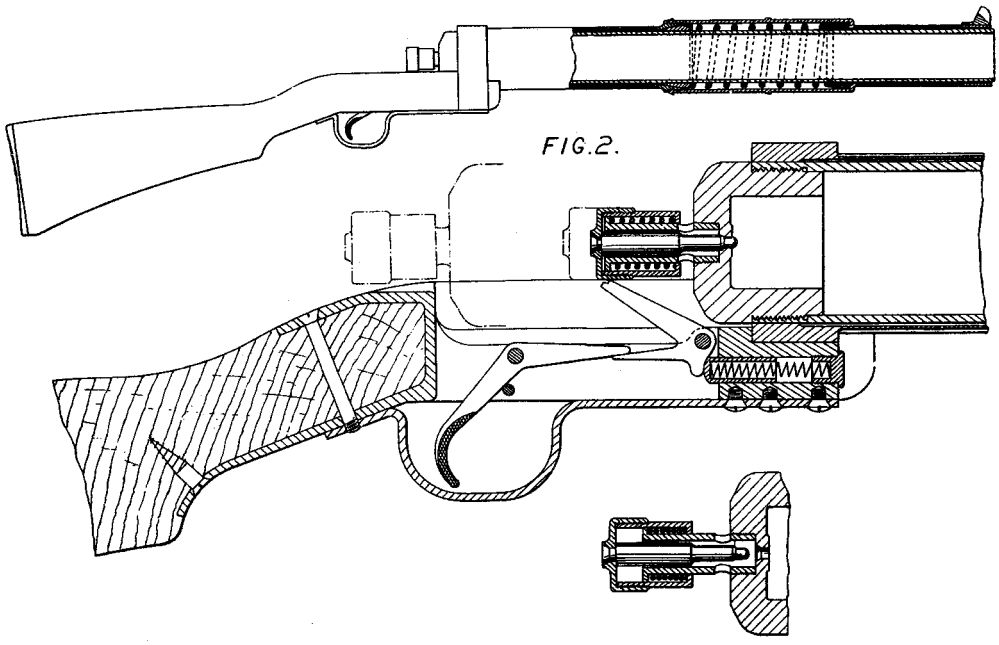
The experimental workshop design of rifle stand illustrated in 'Notes on Inventions and New Stores No. 2', July–August 1917. (MUN 4/3590)

In the summer of 1917, the Royal Engineer workshops designed a much more simple stand in which the rifle was set at 45°. It was no more than an upright ¾-inch thick slab of wood 2 feet 7.5 inches in length and 4.5 inches wide with a slot cut in the top to rest the muzzle of the rifle and a 6-inch spike to stick it in the ground. Again, sandbags were used to steady the stand and the rifle. The rifle's forward sling swivel was relied on to stop the rifle jumping out of the slot with the recoil and range was altered by using the rubber rings and range cards. The butt could be moved sideways to some extent to make corrections for line. This was an 'experimental workshop type' described in 'Notes on Inventions and New Stores No. 2' for July–August 1917. Since it was not mentioned in subsequent 'Notes' there is nothing to indicate whether it proved to be successful in operation.

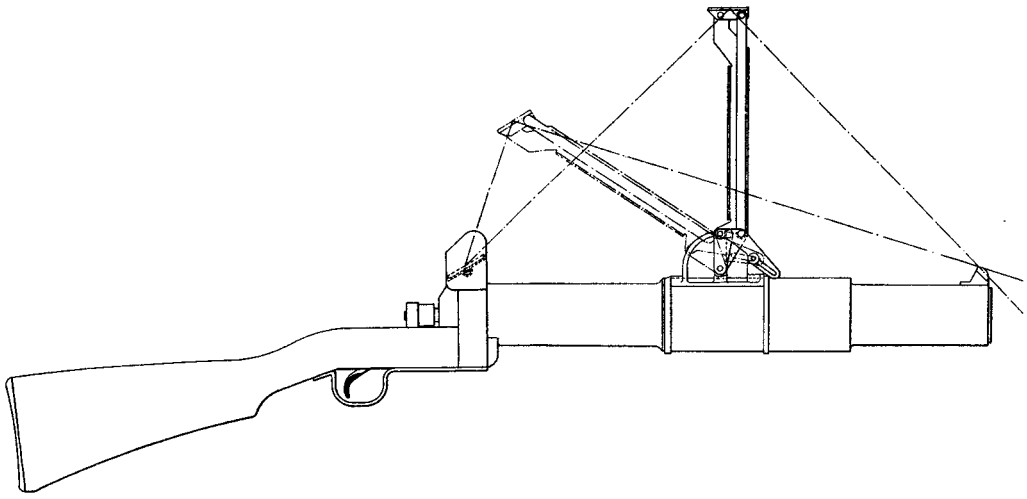
The combination of grenade and rifle was effective but inconvenient as it meant that the rifle could not be used for its original purpose of firing ball ammunition. Moreover, although the need for stands rendered the rifle grenade less mobile, it was nevertheless more mobile as a weapon than the light trench mortar which fired a bigger bomb to a greater distance. To some extent, the rifle grenade and the light trench mortar encroached on each other's territory but the matter was never resolved because the tactical use of rifle grenades was never clarified. Rifle grenades tended to be used to attack snipers, mortar positions, pillboxes and strong points but the light mortar could do the same job more effectively. However, there were more rifle grenadiers in a battalion than light mortars and the rifle grenade was clearly an infantry weapon whereas the light mortar was somewhere between the infantry and the artillery. This lack of clarity about who was responsible for which weapon and about which one should be used in which circumstance led some people to think that an entirely new weapon was needed by the infantry, one that could fire grenades to rifle grenade distances and which was truly mobile.

These grenade guns as they were called had only one function: to fire grenades. The advantage to this was that they allowed the rifle to return to its original role. There were, however, a number of difficulties, not the least of them being that the grenade gun was an additional item of equipment for the soldier to carry, and some of them fired their own special ammunition that further added to the infantryman's burden. By 1917, when the grenade gun was being seriously considered by research departments like the Munitions Inventions Department, the rifle-fired bullet was no longer contemplated by the majority of the infantry as their principal means of killing the enemy. There were numerous directives that emphasized the need to shoot the enemy, when the rifle could be brought to bear, rather than relying on the grenade, irrespective of how it arrived at the enemy's feet. The truth was that the average infantryman had more faith in explosives than bullets for dealing with the enemy and by 1917 he had more experience with grenades than musketry. In this respect, the opinion of those responsible for approving new weapons was rather out of touch with what the soldier at the Front was actually doing, despite the directives, which in one sense were merely trying to restore the status quo of the rifle. However, these things are never as clear-cut as making a simple choice between yes and no.

It would appear that only two grenade guns received serious attention and these were quite dissimilar weapons. The first was a shoulder-fired grenade launcher invented by an engineer called Leonard Thring following conversations with officer friends at home on leave from France. They impressed on him that such a weapon was sorely needed. Thring noted their suggestions and devised a recoil-absorbing grenade-thrower that could be fired from the shoulder, for which he applied for two patents in January 1916 (granted as 124,469 and 124,478 in 1919 – the first one was for a special sighting device for the gun). In essence, it



Thring's grenade gun, the subject of UK patent 124,478. These drawings illustrate the trigger mechanism and the recoil system. Note that the breech moves back over the fore-end towards the firer's face.



The sighting device on the Thring grenade gun, described in UK patent 124,469. A mirror is mounted at the top of the folding frame.

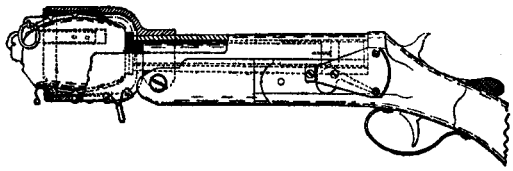
was simply a smooth-bore barrel (a length of steel tube) clamped to a wooden stock. It was not unlike the M79 grenade launchers used by the US Army in the 1960s except that Thring's device used a recoil-absorbing mechanism. This mechanism consisted of a recoil spring that encircled part of the barrel, and a ring of 'brake blocks' behind the spring, all of which were covered by a tubular casing joined to another tube, inside which was the barrel. This mechanism stayed put while the barrel travelled backwards when the gun was fired. It was rather too complicated to work well.

The Munitions Inventions Department gave the gun a series of trials but by April 1917 it had been turned down because it required special ammunition, was too cumbersome and the recoil was excessive. It is worth noting that when Thring invented his gun and its ammunition, which did not require a rod, rodded grenades were the only sort of rifle grenade available and these were nothing like 100 per cent reliable; the cup discharger had yet to make its appearance. By the time it was turned down, however, the cup discharger was undergoing successful trials. Moreover, the cup discharger was lighter and simpler and did not require special ammunition. Had the cup discharger not been invented it is likely that the Munitions Inventions Department would have persisted with the Thring gun. For his part, Thring entertained loftier thoughts about the usefulness of his invention and envisaged that it would replace the Stokes mortar, a somewhat unrealistic fantasy. He did not take the rejection lying down. Astonishingly, his patent agents (the firm of Kilburn and Strode which still exists) wrote to the parliamentary secretary, Ministry of Munitions, in July to argue their client's case. This was not the sort of thing that patent agents do as a general rule but it appears that Thring was a friend as well as a client. Even so, the letter changed nothing.

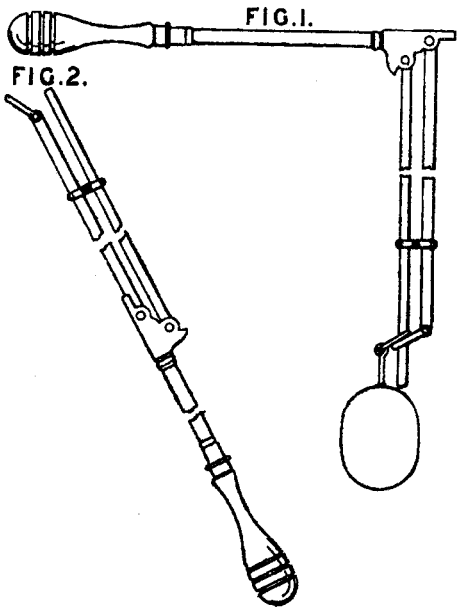
But there may have been another explanation for the department's unwillingness to persist with Thring's gun: the Munitions Inventions Department was developing its own design which may have been inspired by it. In the early part of 1918, the department conducted comparative trials with 'various guns for firing grenades' and its own design produced the

best results. It was more versatile than the Thring as it did not require special ammunition and the grenade could be launched by both blank and bulleted rounds, using the Lee Enfield rifle mechanism (the Thring had its own design). The grenades which it fired did not have an axial bore to allow the bullet to go through them like with the Viven-Bessière; the bullet actually hit the base of the grenade to launch it. The gun was not intended to be fired from the shoulder and could be fitted with a base plate for resting it on the ground, or with a short shaft, the whole thing weighing in the region of 12 lb. It appears that the barrel which took the grenade was interchangeable with the Burn discharger or a 50 mm design that was evidently under test as well. The 50 mm discharger seems to have been a French design used for firing a grenade with an axial bore. This may have been a Viven-Bessière device.

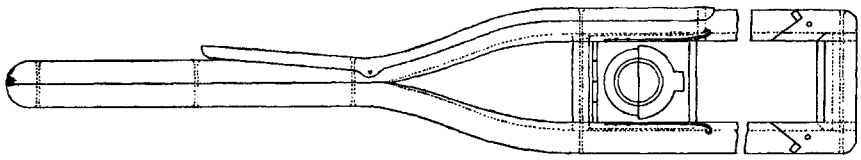
Another of the grenade guns used in the trial was probably F.V. Lister's converted shotgun for firing Mills grenades for which he filed a patent application in March 1916 (granted as 124,765). Various bomb-throwers for firing special grenades were invented during 1915 and 1916 but none of them proved to be sufficiently interesting to warrant serious consideration. There were, of course, a number of contraptions for throwing hand grenades apart from the catapults and spring guns. These were aids to the thrower rather than substitutes for his arm and included P.D. Malloch's 'hand-device for throwing bombs' that worked on a simple mechanical principle and the 'hand-device for



The Lister grenade gun, a converted shotgun, the subject of UK patent 124,765. The triangular shape in front of the hammer is a clinometer. The grenade is retained in the cup by clips.



P.D. Malloch's mechanical grenade-thrower (UK Patent 103,379). Note the hobk on the end of one arm for pulling the pin.



Bomb-throwing bat for throwing the Mills, subject of UK patent 104,376. Gripping the bat's lever releases the bomb-carrier which moves up guides when the bat is swung. Spring clips holding the two-part carrier together slip into special notches, allowing the carrier to open and release the bomb.

throwing the Mills bomb' invented by Storch and Davis, a bat with a sliding bomb-carrier. Neither seems to have excited much interest. The only other device to undergo lengthy trials, including troop trials in France, was the Temple device. This appears to have been a cross between a small trench mortar and a grenade gun and was fed by a magazine.

According to the description in 'Notes on Inventions and New Stores No. 1', published in the spring of 1917, it could be 'carried either on the chest on a breast plate fitted with straps, or on the bayonet boss of the rifle'. It consisted of

> a magazine containing six separate barrels each with a cartridge chamber. Four magazines can be carried on the breast plate and one on the rifle. Each chamber is loaded with a special cartridge which is caused to set back on a pin in the base of the chamber by insertion of the rod of the grenade. The grenade is jerked down towards the base, and the explosion of the cartridge thus caused, forces a disc up the barrel expelling the grenade rod with little noise and with no flash. The safety pin of the grenade is withdrawn automatically in flight by means of a small weight attached to the ring of the safety pin – the set back of the weight on shock of discharge withdrawing the pin. To eject the cartridges, the magazine has to be unscrewed bodily and a rod inserted down each barrel. It is then reloaded and replaced. The range is about 75 yards, and the accuracy depends on the angle at which the apparatus is held either on the chest, or on the rifle. The weight of each magazine loaded is about 3½ lbs.

It raises the question of why this curious device should have been seriously viewed as suitable for front-line use as it seems too absurd to be workable. Moreover, the potential for accidents seems enormous.

Temple brought his invention to France to demonstrate it in the spring of 1917 and 'both forms proved very satisfactory, and attained all the advantages claimed . . . by the inventor'. These evidently concerned accuracy, rate of fire and lack of noise and flash. Remarkably, GHQ seemed to believe that there were other similar devices in Britain just waiting for a comparative trial in France as it asked the Army Council for 'all available throwers of the present pattern, both for firing from the chest and for firing from the rifle [to] be sent out at once for practical trials'. This must have been received with some bafflement. GHQ was no doubt disappointed not to receive a variety of similar devices but merely a note informing them that such things did not exist. So keen was GHQ to try out the Temple device at the Front that it immediately asked for 200 of them and 10,000 cartridges.

Nothing seems to have come of it although a Munitions Inventions Department report from May 1918 mentioned a Temple bomb-thrower which looked promising and for which copper driving bands were not needed for the bombs. A 2 lb charge threw a 220 lb bomb 1,225 yd at 59°. This was clearly not the same device.

One of the last grenades that the Munitions Inventions Department was keen to develop was a 'rebounding grenade' that did not explode on impact but rebounded to explode in the air. It was a percussion grenade based on the Stewart pattern. However, lest anyone think that this was another weird idea from the Heath Robinson school, a rebounding mortar bomb was already being used by the German Army (described in Chapter 2). It was the effectiveness of this device that persuaded the Munitions Inventions Department that the British Army should have one as well. It never got one.